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AGRICULTURAL DEPARTMENTS IN HIGH SCHOOLS AND COLLEGIATE INSTITUTES.

The following courses in Agriculture and the list of apparatus are being considered by the Education Department. In addition to such courses, pupils in the special Agricultural departments will take the subjects that are obligatory on all pupils, with such modifications as may be deemed expedient by the Principal and approved by the Education Department.

Part of the proposed scheme also is that the teacher of Agriculture would take classes in his department in the school, of pupils from the surrounding country, the members of which might not be in regular attendance in the other High School classes; and that, if practicable, he would hold special classes at suitable times in other parts of the county. In addition this teacher would act in the neighborhood as a special agent of the Agricultural College.

I. ACCOMMODATIONS REQUIRED.

A laboratory, school gardens, arboretum, experimental plots.

II. COURSES OF STUDY.

First Year.

Agricultural Physics: To keep records of the weather in standard book supplied by O.A.C. Physics Department, of accidents from lightning; of average temperatures, rainfall, etc., and to report monthly on same to the O.A.C.

Examination and classification of soils; laboratory exercises on elementary physical analyses of school garden or home garden soils; local excursions for the collecting and studying of soils. Pupils should be able to recognize, name and describe the different kinds of soils of the neighborhood.

Laboratory exercises to estimate the water capacity of different soils; to demonstrate capillary force; to show how soil water is conserved and the necessity for conservation; drainage.

Chemistry: Oxygen, hydrogen, nitrogen, carbon; air, water, ammonia, carbon dioxide—a practical course.

Agricultural Botany: Weeds and weed seeds: seed testing for purity according to the rules of the Seed Control Act of 1905. Experiments to show the relations of the plant to the soil, light, air, temperature and moisture.

Study of tree growth.

Plant families of chief economic importance.

Ministry of Education, Ontario
Historical Collection

HORTICULTURE: Selecting and storing flower and vegetable seeds for next year. Methods of gathering, grading, packing, storing, shipping of fruits; visits to orchards, cold storage plants, canning factories, markets, fruit shows. Treatment of fruit-plantations, pruning, spraying, cover-crops.

Propagation by seeds, budding, grafting, layering, cuttings. In the spring, making and keeping of a garden with plots for carrying on some of the experiments of the Experimental Union—such as testing varieties of fruits and vegetables.

Constructing and caring for a hotbed.

FIELD HUSBANDRY: Experimental plots in the school farm in accordance with Experimental Union; one on cereals, one on fodders, one on root crops.

Germination tests of the selected seeds of common farm plants.

Seed judging; changing seed; quantity of seed per acre.

ANIMAL HUSBANDRY: Visits to local stock farms, to learn best methods of housing, feeding and handling farm animals.

Visits to fairs or stock-sales to become acquainted with different breeds.

Judging of types of farm animals; beef and dairy cattle, light and draft horses, bacon hogs, short and long wool sheep.

DAIRY HUSBANDRY: Visits to local cheese factories and creameries to learn, in general, the factory methods of caring for milk, utensils and finished products.

Dairy stables: lighting, cleaning, ventilating.

Individual cow testing: this is to be carried on by some of the students at home.

POULTRY: Visits to poultry plants, shows, markets. Planning and building poultry houses.

Leading breeds; care and feeding of fowl.

FARM CARPENTRY: A modification of the ordinary Manual Training course to suit farm boys.

How to use, sharpen, care for such tools as a farmer's kit should contain.

Models of joints, splices necessary in making farm buildings or appliances.

FARM ARITHMETIC AND BOOKKEEPING, ETC.: Practical measurements of land surfaces, wood, stone, walls, tanks, bins, mows, lumber.

Cost of fencing, buildings, silos, feeds.

Study of market reporting in daily papers, local and foreign.

Assessment rolls and methods of fixing tax rate.

Keeping farm accounts of each field.

SECOND YEAR.

AGRICULTURAL PHYSICS: Soils: Work of first year continued.

Methods of tillage; underdrainage and taking of levels.

Mechanics: Principles of farm machinery; pumps, levers, pulleys, engines.

Principles of ventilation, lighting, draining.

CHEMISTRY: Soils, fertilizers, foods.

AGRICULTURAL BOTANY: Work of first year continued.

Farm crops: Study and classification of leading cereals, grasses, legumes; diseases and how to recognize and combat.

Forestry: Study of the common trees of the neighborhood; care of a small forest nursery in connection with the school farm; transplanting; reforestation of waste land.

Visits to local saw and planing mills; grades of lumber and prices.

HORTICULTURE: Work of first year continued.

Plant Diseases: Common vegetable and fruit diseases; spraying and fungicides; practice in orchards of neighborhood.

Economic Insects: Study of injurious and beneficial species; insecticides and their aplication.

Garden Work: Experiments in conjunction with the Experimental Union.

Plant breeding and selection.

FIELD HUSBANDRY AND FARM MANAGEMENT: Systems of rotation; laying out of a farm; mixed farming; special farming; intensive farming; cost of farming operations.

Improvements of soils by fertilizers, manures and clovers demonstrated in experimental plots on the school farm.

Seed selection: Experiments on school plots to show its value.

Plant breeding: Experiments on hybridization on school plots or at home.

ANIMAL HUSBANDRY: Work of first year continued.

Feeds and feeding; rations.

Care of animals in sickness.

Animal physiology.

DAIRY HUSBANDRY: Care and feeding of cows; rearing calves.

Chemistry of milk; elementary bacteriological studies of milk.

Milk testing; Babcock testers.

Management of hand separators, barrel churns, butter worker, butter printer.

POULTRY: Care and feeding; treatment of common diseases; elementary laboratory study of the embryology of a chick; incubation.

Individual hen records by means of trap nests.

MANUAL TRAINING: Farm blacksmithing; use and care of iron-working tools; exercises in repairing farm machinery; exercises in making such articles as rings, chain links, harrow teeth, cold chisels; welding and tempering.

FARM ECONOMICS: The Agricultural and Arts Act; co-operative associations; commercial law relating to farmers; municipal organizations; forms and contracts.

EQUIPMENT FOR AGRICULTURAL DEPARTMENT IN ONTARIO HIGH SCHOOLS.

NOTE.—It is not intended that the equipment listed below is to be immediately supplied, but, in the development of the work, this list may be used as a guide in the purchasing of the school's needs.

In many cases manufacturers will be found willing to put in equipment for demonstration purposes. In other cases, friends of the school will loan equipment. In any case expensive apparatus should not be bought before there is a certainty of a necessity for it.

The High School, in most cases, will be supplied already with a considerable part of this equipment. Where Manual Training work is organized, there will be no need for any new equipment of tools.

General Requirements.

(1) A cabinet, made on some unit system, with drawers or sections suited to holding herbarium mounts, bird skins, geological specimens, mineralogical specimens, fungous diseases, etc., etc.

(2) A large table with drawer and cupboard facilities, suitable for demonstrating experiments. The projecting top should be heavy and finished to withstand water and chemicals. Where water, gas and electricity are available, these should be put in.

ESTIMATE OF COST OF EQUIPMENT.

Note.—It is not intended that every school should have all this equipment; local conditions will determine the extent of such.

General:	
Land—amount to be determined by local conditions (one acre might be ample)	
Office fittings	
Laboratory tables, etc.	$100 00
Collection cabinets, to commence with	50 00
Library	
Agricultural Physics:	
For Drainage work	57 45
For Weather work	32 75
For Soil work	16 00
For Mechanics	18 00
Chemistry: Same equipment as used in High Schools.	
Farm and *Garden Work*	80 00
Farm Carpentry and *Blacksmithing:*	
For Farm Metal Work	87 26
For Farm Carpentry Work	42 00
Poultry	40 00
Dairy Husbandry	100 00
Entomology	20 00
Botany	60 00
	$702 46

Physical Equipment.

(Numbers refer to catalogue listing.)

For Drainage Work.

1 Architect's Dumpy Level, for survey work, complete (5017) (Keuffel & Esser, New York).	$35 00
1 Levelling Rod (6252)	12 00
1 Surveyor's Chain, 66 feet (7786 D)	3 20

or

1 Surveyor's Chain, 100 feet (7786 B)	3 50
1 Home-made Drainage Level (to be made by teacher) Level, $1.25; Wood, 50c.)	1 75
2 Sets Arrows (7811) ($1 a set)	2 00
	$57 45

For Weather Work.

Box, to be made at school (blueprint showing design may be had at the O.A.C.)	$5 00
1 Standard Rain Gauge (330) (Henry J. Green, Brooklyn, N.Y.)	5 25
1 Maximum Thermometer (34) (Negretti & Zambra, Holborn Viaduct, London, England)	5 25
1 Minimum Thermometer (36) (Negretti & Zambra)	5 25
1 Aneroid Barometer (Special 58) (Henry J. Green), to be provided without symbols "stormy," etc., and adjustable ring.	12 00
	$32 75

For Soil Work.

2 dozen Zinc Tubes, with gauze diaphragm 1 inch from bottom, for determining water capacity of soil, $7\frac{1}{2}$ inch by $1\frac{1}{2}$ inch.	$3 50
2 dozen Trays for setting above tubes into, $3\frac{1}{2}$ x $2\frac{1}{2}$ in. x $1\frac{1}{2}$ in. deep	2 00
12 Long Glass Tubes (1 inch diameter, 4 feet long)	7 80
1 Rack and Tray for above	1 50
12 Zinc Trays, 7 x 7 in. x 1 in. deep, for showing optimum water content for tillage and spatulas	1 20
	$16 00

Agricultural Physics.

For Mechanics.

3 Levers, to illustrate principles of levers	$1 50
Set of Weights for use with above, to be fitted with hooks for attachment to levers or pulleys; 6 of each, $\frac{1}{2}$ oz., 1 oz., 2 oz., 4 oz., 8 oz., 1 lb., 2 lb., 3 lb., 5 lb. (Eimer & Amend)	7 50
Set of Pulleys, such as used at O.A.C., Guelph (H. A. Clemens Co, Guelph)	7 50
Model of ordinary pump	75
Model of pressure pump	75
	$18 00

For Farm and Garden Work.

1 Small Scales, weighing $\frac{1}{2}$ oz. up to 240 lbs.	$9 00
1 Truck Scale	
1 Grain Tester, gallon (W. & J. G. Greey, Toronto)	20 00
1 Set Grain Measures, $\frac{1}{2}$ bushel, 1 peck, 1 gal., 1 qt., 1 pt.	2 50
1 doz. Germinating Boxes, to be made by students, standard size used at O.A.C., suitable for 100 seeds	1 50
1 doz. Zurich Germinators	60
2 doz. Plates for seed testing	1 20
1 Set of Sieves (15) perforated zinc, as per standard at O.A.C.	3 75

1	Air-tight Box, for killing pea-weevils, grain insects, to be made at school	50
1	5-gal. Crock for treating wheat, oats, etc., for smut	50
	Collection of grains, vegetables, tree seeds, weed seeds, etc., to be made at school	
1	Dominion Government Seed Collection	2 00
1	Hand Seed Drill (Planet Junior or New Model)	7 00
1	Hand Wheel Hoe (Planet Junior or Iron Age)	7 00
	Spades, Digging fork, Hoes (Draw or Dutch), Rakes (flat backed steel), Trowels, Hand weeders, Garden line and reel, Stakes and labels, Mallet	25 00
		$80 55

For Farm Metal Work.

1	Grindstone, 24 x 3 in. in iron frame	$28 00
1	Anvil, 100 lbs. (Peter Wright)	11 00
1	Small Portable Forge	8 50
1	Ballpein Hammer, 1½ lbs.	85
1	Ballpein Hammer, 1¼ lbs.	75
1	pair Flat Tongs	70
1	pair Forging Tongs	80
1	pair Belt Tongs	75
1	pair Gad Tongs	65
1	pair Pick-up Tongs	70
1	Hot Set	65
1	Cold Set	65
1	Hardy	48
1	Swage, top and bottom, ¼ inch and ½ inch iron	65
1	Set Flatterers, 2 inch square	65
1	Top and Bottom Fuller, ½ inch	65
1	Set Punches, ⅜ inch and ½ inch, round	50
1	Set Punches, ⅜ inch and ½ inch, square	50
1	Set Flat Chisels, ½ in., ¾ in.	80
1	7-inch Beck Iron	1 25
1	Set Cold Chisels (1) flat (1) cape	1 00
1	Adjustable Hack Saw, and set of blades	2 00
1	Small Hand Drill	8 00
1	Set S. S. Drills for above, ⅛, 3/16, ¼, ⅜, ½, ⅝ inch	1 00
1	Calipers, outside, 5 inch	55
1	Calipers, inside, 5 inch	55
1	Steel Blacksmith's Square for forge work	85
1	Machinist's Steel Rule	85
1	Rivetting Hammer	50
1	Soldering Iron and Solder	50
1	Set Files, 8 in. half-round bastard, 8 in. half-round smooth, 8 in. flat, 10 in. square bastard, 10 in. flat, 10 in. half-round.	85
1	Screw Plate (Diamond No. C)	4 00
1	Pair Cutting Pliers	88
1	Vise, 4-inch jaws	6 25
		$87 26

For Farm Carpentry.

Bench and Vise	$10 00
Cutting Tools.—	
Saws :	
Rip Saw	1 40
Keyhole, Compass or Turning Saw	40
Back or Tenon Saw	1 25
Panel	1 00
Metal Saw	35
Chisels :	
$\frac{1}{4}$ in. Socket Mortice Chisel	25
$\frac{3}{8}$ in. Socket Mortice Chisel	30
$\frac{5}{8}$ in. Socket Mortice Chisel	35
$\frac{3}{4}$ in. Socket Mortice Chisel	40
$1\frac{1}{4}$ in. Socket Mortice Chisel	55
$\frac{3}{4}$ in. Bevelled-edge Firmer	28
Cold Chisel	5
Planes :	
Jack Plane	1 25
Block or Hand Plane	65
Spokeshave	30
Files :	
Saw, triangular or three-cornered file	10
10 in. half-round	30
8 in. Flat or Mill-saw File	15
$\frac{1}{4}$ in. Round or Rat-tail	15
Boring Tools :	
$\frac{1}{4}$ in. Augur Bit	15
$\frac{3}{8}$ in. Augur Bit	18
Gimlet Bit	8
Augur Bits, $\frac{1}{4}$ in., $\frac{3}{8}$ in., $\frac{1}{2}$ in., $\frac{9}{16}$ in., $\frac{5}{8}$ in., $\frac{3}{4}$ in., $\frac{7}{8}$ in., 1 in.	2 25
Drill	18
Shears :	
Tinman's Shears	1 00
Cutting Pliers	75
Scissors	75
Marking Tools :	
Tape Measure	2 25
Land Chain	3 30
Marking Gauge	15
Mortice Gauge	60
Scratch or Marking Awl	15
Compasses	40
Testing Tools :	
Try Square	35
Framing Square	1 25
Bevel	35
Level	75
Holding Tools :	
Iron Bench Vise	45
Ratchet Brace	1 50

Monkey-wrench	45
Small Screw-driver	20
Screw-driver or Turnscrew (large)	30
Screw-driver bit	10
Pliers	75
Driving Tools:	
Hammer (claw)	50
Rivetting Hammer	50
Mallet	35
Nail Set or Punch	15
Saw Set	50
Miscellaneous Tools:	
Oil-stone	40
Oil can	5
Putty Knife	15
Belt Punch	10
Glass Cutter	35
Sloyd Knife	35
Can-opener	10
Wad Punch	15

Single Bench Tool Kit.

Summary:

Cutting Tools	$15 05
Marking Tools	6 85
Testing Tools	2 70
Holding Tools	3 75
Driving Tools	2 00
Miscellaneous	1 65
Bench and Vise	10 00
Total Cost	$42 00

For Dairy Work.

	Probable cost.
1 Barrel or Box Churn, size to suit herd	$3 50 to $7 00
1 Lever or Roller Worker	2 00 to 5 00
1 Butter Mould, size one to two pounds	45 to 3 00
1 Shipping Box, with icebox in centre and wooden trays	3 00 to 4 50
1 Thermometer (glass)	20 to 50
1 Salt Sieve (hair)	30 to 75
1 Pair Scales, to weigh quarter ounces	3 50 to 5 00
1 Buttermilk Strainer, size 2 to 4 quarts, with perforated tin bottom	25 to 50
1 Butter Ladle	20 to 40
1 Cream Pail (tin, with handles on sides and tin stirring spoon)	1 00 to 1 50
Creamer Cans and box for cold water (8 cows)	5 00 to 20 00
1 Cream Separator (10 or more cows)	60 00 to 75 00
1 Brush for cleaning utensils	20 to 30
1 Supply of Washing Soda or Borax	
A Supply of good Butter Salt, per sack	70 to 1 60

Butter Color, if thought advisable to use it, per bottle or per gallon	25 and 3 50
Parchment Butter Paper, per 1,000 sheets	1 00
Babcock Milk Tester (8 bottles)	1 00
Lactometer (Quevenne)	1 50
1 Cow Testing Outfit, such as recommended in Bulletin 12, Dominion Department of Agriculture. There is a probability that the schools may be supplied with these free.	
1 Straightspring Scale (Fig. 1), capacity 40 lbs.	1 25
1 Sample Bottle for each cow (Fig. 3), each	6 to 10
1 Sample Dipper (Fig. 4), each	10
1 Box for holding samples (Fig. 5), each	75
1 Package of 500 Preservative Tablets	75
	$100 00

For Work in Entomology.

(Much of this equipment can be prepared at school.)

Killing Bottles, Insect Boxes, Insect Nets, Insect Pins, Insect Spreading Boards, Breeding Cage, Insect Labels, Insect Larva Bottles, Cork	$20 00

For Poultry Work.

1 Incubator	$30 00
1 Brooder	10 00

Models of trap nests, hen houses, etc., to be made by students.

For Work in Botany.

1 Compound Microscope, 2 objectives	$35 00
Plant Collecting Cans, Magnifying Glasses, Forceps, Razors, Needles, Glass Slides, Cover Glasses, Herbarium Mounts, Labels, Bell Jars, Beakers, etc.	25 00